

Point prevalence study on the use of antibiotics at a tertiary healthcare institution during the absence of the COVID-19 wave

Antibiotic usage at a tertiary healthcare

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Abstract

Aim: The COVID -19 pandemic still continues in waves. In this study, we aimed to identify the antibiotic prescribing approach and inappropriate antibiotic ratio, and to improve antimicrobial stewardship.

Materials and Methods: This study is single-center, cross-sectional, and retrospective. We evaluated antibiotic usage using one-day point prevalence. The study was conducted on patients admitted to surgical wards, internal wards and intensive care units.

Results: Of the study participants, 120 (52%) used antibiotics. Of the patients using antibiotics, 52 (43%) were male, and 68 (57%) were female. Of these patients, 65 (54%) were hospitalized in surgical units, 35 (30%) in internal units, and 20 (16%) in intensive care units. In 77 patient, antibiotics were started correctly and on the spot, and in 43, inappropriate antibiotic use was found. In these patients, 45% of antibiotics were started empirically, 21.7% based on culture, and 33.3% prophylactically.

Discussion: The misuse of antibiotics, which is one of the most commonly consumed drugs, is a global problem that threatens not only the health of the patient, but also the health of the entire community. When antibiotics are used too much, especially in health institutions, resistant strains may cause selection and spread. Improving antimicrobial prescribing will help control antimicrobial resistance.

Keywords

Antibiotic Usage, Point Prevalence, Tertiary Healthcare Hospital

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Introduction

Antimicrobial resistance, defined as one of the top ten threats to global health by the World Health Organization (WHO), is a public health problem that continues to be important worldwide with the COVID-19 pandemic [1].

If the current trend of inappropriate and excessive use of antibiotics continues, it is estimated to cause 10 million deaths worldwide by 2050 [2].

The COVID-19 pandemic has significantly impacted antibiotic use and antibiotic stewardship [3].

Resulting in a worry about antimicrobial resistance due to the inappropriate rise in antibiotic use during this pandemic [4,5]. Inappropriate use of antibiotics is one of the major causes of antibiotic resistance.

Point prevalence studies (PPS) provide quick ways to understand the quantity and quality of antimicrobial prescribing, which helps antimicrobial stewardship [6].

The COVID -19 pandemic still continues in waves. We conducted a point prevalence study on the use of antibiotics at a tertiary healthcare institution during the absence of the COVID-19 wave.

In this study, we aimed to identify antibiotic prescribing approach and inappropriate antibiotic ratios, and to improve antimicrobial stewardship.

Material and Methods

Ethical consent

This study was approved by the Non-Invasive Clinical Ethics Committee of Balikesir University Medical Faculty on January 04, 2023 (no: 2023/06).

This study is single-center, cross-sectional, and retrospective. We evaluated antibiotic usage using one-day point prevalence. Patients admitted to surgical wards, internal wards and intensive care units (ICUs) on 3 January 2023 were included in our study.

Inclusion criteria

We included all patients over the age of 18 who were hospitalized in wards or intensive care units during the surveillance period.

Exclusion criteria

Patients under the age of 18 and hospitalized in the outpatient clinic and the emergency department were excluded from the study.

Medical records in case files, bedside treatment charts, culture reports, and medical computer records were evaluated by the study team.

The number/percentage of patients prescribed antimicrobials was calculated. Antimicrobial prescriptions were classified as empirical, prophylactic, or culture-based. Antimicrobial prescriptions were evaluated as appropriate/inappropriate for the indication. The appropriateness of antibiotic use was assessed by an Infectious Diseases specialist.

Biostatistics

SPSS 20.0 package program was used for statistical analysis. The chi-square and Fisher’s exact chi-square test were used to compare categorical variables. P-values <0.05 were considered statistically significant.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

It was determined that 120 (52%) of the 230 hospitalized patients included in the study used antibiotics. Of the patients using antibiotics, 52 (43%) were male and 68 (57%) were female (Table 1). Of these patients, 65 (54%) were hospitalized in surgical units, 35 (30%) in internal units, and 20 (16%) in intensive care units.

In:77 patients, antibiotics were started correctly and on the spot, and in 43 patients, inappropriate antibiotic use was found. There was no inappropriate antibiotic use in patients for whom infection consultation was requested (p<0.0001).

We found that the highest rate of appropriate antibiotic use was in the intensive care unit, while the lowest rate in empirical use was in internal services.

In these patients, 45% of antibiotics were started empirically, 21.7% culture-based, and 33.3% prophylactically (Table 2).

Table 1. Comparison according to the appropriate antibiotic usage.

		Appropriate usage n:77	Inappropriate usage n:43	p
Gender	Women/Men	30/47	22/21	0.249
Age		63±16	56±17	0.031*
With IDS approval	Empirical	13	27	0.001
	Culture-based	38	16	
	Available	26	0	0.001
Patients admitted to the clinic	Adult medical wards	27	8	0.001
	Adult surgical wards	31	34	
	Adult ICU	19	1	

Fisher's exact chi-square test *p<0.05, Student's T-test* p<0.05
Infectious disease specialist (IDS)

Table 2. Distribution of reasons for antibiotic use according to wards.

		Prophylactic n:40	Empirical n:54	Culture-based n:26	p
Patients admitted to the clinic	Adult medical wards	5	23	7	0.001
	Adult surgical wards	33	20	12	
	Adult ICU	2	11	7	

Fisher's exact chi-square test *p<0.05

Discussion

The misuse of antibiotics, which is one of the most commonly consumed drugs, is a global problem that threatens not only the health of the patient, but also the health of the entire community [10]. When antibiotics are used too much, especially in health institutions, strains of resistance may cause selection and its spreading. In our study, we found that more than half of the hospitalized patients have used antibiotics. In Turkish hospitals, the point prevalence and inconvenience of antimicrobial use were similarly high [7]. In a point prevalence study conducted abroad, the rate of antibiotic use was over 50% [8]. However, comparison is difficult due to different assessment

methods and different reporting routes in different countries, at different times. In the literature, the rate of inappropriate antibiotic use in the hospital setting ranges from 9% to 64% [9].

In a point prevalence study on antibiotic use in Turkey by Tartari et al., similar to our study, 98% of cases where inappropriate antibiotics were used were found to be a group without an infection specialist consultation [11].

High rates of antibiotic use have generally been associated with inappropriate antibiotic use and the development of antibiotic resistance and healthcare-associated infections [12].

Empirical antibiotic prescription is defined as the initial prescribing of antibiotics in the absence of culture reports [1,13]. Empirical antibiotic use was found to be at the forefront in internal service patients. Similar studies conducted in Turkey determined that more than two-thirds of antimicrobials were prescribed empirically in hospitals [7].

Culture-based, agent-directed antibiotic prescription has been defined as antibiotic prescribed after the pathogen has been identified and reported [13].

In the treatment for the causative agent, the highest rate of appropriate antibiotic use was found in the intensive care unit. The reason for this was thought to be the routine evaluation of intensive care patients by an infection specialist.

Prophylactic antibiotic prescription is defined as an antibiotic prescribed to prevent an infectious complication of a disease or to prevent an infectious complication resulting from a surgical intervention [14]. The high rate of prophylactic antibiotic use in surgical wards was thought to be due to surgical prophylaxis.

The limitations of our study were that only inpatients were included, and antibiotics prescribed to patients in the outpatient clinic were not included.

Continuous evaluation of antibiotic use is significant to maintain the efficacy of antibiotics and to minimize resistance [15].

As a result of the study, it was determined that antibiotic use was high with the point prevalence method and that antibiotic management programs are needed for appropriate antibiotic use. Improved prescribing of antimicrobials will help control antimicrobial resistance.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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